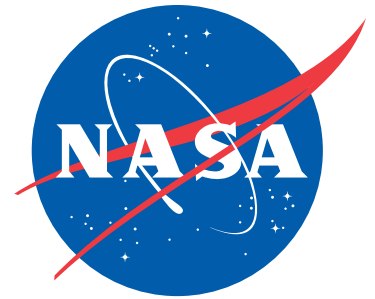


# Spaceport News

John F. Kennedy Space Center - America's gateway to the universe



## Inside . . .

'Special' Kennedy K-9 dies



Page 2

Dream Chaser reaches milestone



Page 2

Former Apollo engineer visits Orion



Page 5

No ceiling necessary for this clean room



Page 6

## High energy, innovation prevail at Lunabotics Mining Competition

By Linda Herridge  
Spaceport News

Lunabotics Team NA-SACAR from the University of Alabama, partnering with Shelton State Community College, both in Tuscaloosa, took the overall grand prize, the Joe Kosmo Award of Excellence. This, after a week of high-energy competition at NASA's third Lunabotics Mining Competition, May 21-26, at the Kennedy Space Center Visitor Complex in Florida.

"It was a close competition," said team leader and sophomore Adam Melton. "The professional quality and level of every team member helped us to achieve this honor."

For their efforts, the 12-member team of undergraduate and graduate students was awarded a

school trophy, a \$5,000 team scholarship, Kennedy launch invitations and up to \$1,000 in travel expenses for each team member and one faculty advisor to attend one of NASA's remote research and technology tests.

The team also took second place in the Mining Competition category and first place in the Team Spirit, Slide Presentation and Demonstration categories.

Lunabotics Emcee Kimberly Land thanked every team for making this year's Lunabotics Mining Competition fun, exciting and unique. Land is the education, public outreach and communications manager for NASA's Game Changing Development and Earth System Science Pathfinder Programs.

See **ENERGY**, Page 3



CLICK ON PHOTO

NASA/Glenn Benson

A team of competitors works with its robot during NASA's Lunabotics Mining Competition at the Kennedy Space Center Visitor Complex on May 25. For more on NASA's third annual competition, click on the photo.



Photo courtesy of Michael Altenhofen, SpaceX

SpaceX's Dragon capsule floats in the Pacific Ocean awaiting recovery ships May 31.

## SpaceX Falcon 9, Dragon make history with mission

By Steven Sicheloff  
Spaceport News

SpaceX completed a landmark mission May 31 that saw its Dragon capsule deliver half-a-ton of supplies and equipment to the International Space Station and return safely to Earth.

The flight made history as the first privately built spacecraft to rendezvous with the International Space Station. Its true impact is expected to be seen in coming months as the company sends regular resupply missions to the orbiting outpost.

"We are hoping to continue working with NASA and hopefully flying crew within three years," said Elon Musk, the founder, CEO and chief designer for the Hawthorne, Calif.-based Space Exploration Technologies, better known as SpaceX.

NASA engineers worked closely with SpaceX throughout preparations for the uncrewed demonstration mission.

"As a country, we should be very proud," said Mike Suffredini, NASA Interna-

tional Space Station program manager. We took a capability that this agency has nurtured over many years, combined that with a different thought process in spacecraft design and created a team that worked very well. The SpaceX team learned a lot and so did our NASA engineers."

The SpaceX mission combined the goals of two separate flights under NASA's Commercial Orbital Transportation Services Program, known as COTS. Originally slated to fly by the station and then come back to Earth, SpaceX and NASA agreed to let the Dragon connect to the laboratory as long as a string of performance tests were successful.

"We all remember the transcontinental railroad that opened the Western frontier," Pettit told reporters. "It was celebrated and completed by a golden spike. This is kind of the equivalent. No one remembers who pounded it in, but its completion was important and remembered."

Photo of launch, Page 4





# Sierra Nevada tests Dream Chaser design near Rockies

By Rebecca Regan  
Spaceport News

Sierra Nevada Corporation (SNC) Space System's Dream Chaser design passed one of its most complex tests to date with a successful captive-carry test conducted near the Rocky Mountain Metropolitan Airport in Jefferson County, Colo., on May 29.

Just like the space shuttle before it, SNC's Dream Chaser will go through extensive testing to prove its wings will work. The company built a full-scale flight vehicle of the Dream Chaser spacecraft to carry out the evaluations.

Backdropped by skyscraping summits, an Erickson Air-Crane helicopter lifted the full-scale orbital crew vehicle to verify proper aerodynamic flight performance. Future plans call for the flight vehicle to be released to evaluate the design's handling during the landing phase of a mission.

The captive-carry test marks the completion of another milestone for



Photo courtesy of Sierra Nevada Corp.

Sierra Nevada Corporation (SNC) Space Systems' Dream Chaser flight vehicle is lifted by an Erickson Air-Crane helicopter near the Rocky Mountain Metropolitan Airport in Jefferson County, Colo., on May 29, during a captive-carry test.

the Dream Chaser Space System as part of the Commercial Crew Development Round 2 (CCDev2) agreement with NASA's Commercial Crew Program (CCP).

"This is a very positive success for the Dream Chaser team and their innovative approach. I applaud and encourage the designers and engineers to continue their efforts in meeting the objectives of the rest of their CCDev2 milestones," said Ed Mango, CCP program manager.

SNC is one of seven companies working to develop commercial

crew transportation capabilities to ferry U.S. astronauts to and from low Earth orbit and the International Space Station. The Dream Chaser is designed to carry as many as seven astronauts to space, and is the only spacecraft under CCDev2 that incorporates wings and is designed to land on a conventional runway.

"The successful captive-carry flight test of the Dream Chaser full-scale flight vehicle marks the beginning of SNC's flight test program, a program that could culminate in crewed missions to the International Space Station for NASA," said Steve Lindsey, former NASA astronaut and head of Dream Chaser's flight operations for SNC.

Before the company took to the Rocky Mountain skies, it conducted an interface test to demonstrate the release mechanism between the Dream Chaser prototype and the heavy-lift helicopter. It also conducted a ground-based landing gear drop test and a thorough flight test readiness review with engineers, technical experts and representatives

from SNC and NASA.

Another recent milestone included an evaluation of the separation system compatibility of Dream Chaser with its initial launch vehicle, the United Launch Alliance Atlas V rocket, which would be used to release the spacecraft from the rocket's second stage after it has placed the spacecraft into low Earth orbit.

Data from the captive-carry test will provide the company an early opportunity to evaluate and prove hardware, facilities and ground operations in preparation for approach and landing tests scheduled for later this year.

All of NASA's CCDev2 partners, including SNC, continue to meet their established milestones in developing commercial crew transportation capabilities.

## More information

For more information about NASA's Commercial Crew Program, visit [www.nasa.gov/commercialcrew](http://www.nasa.gov/commercialcrew)

# Elite Kennedy K-9 remembered for illustrious career

By Stephanie Covey  
Spaceport News

He protected President Obama, numerous congressmen and women, astronauts, as well as space shuttles and flight hardware. Some call him a hero, but to the Kennedy Protection Service, he just was known as Carlos, an eight-and-a-half-year-old Belgian Malinois and an explosive detection dog at Kennedy Space Center in Florida.

Carlos was an elite member of the K-9 Unit that has served Kennedy since the Apollo program. Capt. Christopher Vaughn, Kennedy's Kennel Master and K-9 Supervisor, trained Carlos as a 2-year-old puppy and said he exhibited a high work ethic, high motivation and was a very professional dog.



"He was the dog every K-9 handler wants, but few deserve," Vaughn said. "He's that dog you want to clone."

In November 2004, Carlos arrived to Kennedy from the Netherlands. He was certified in explosive detection, tracking and criminal apprehension.

Vaughn said that once Carlos was assigned to Kennedy Security Officer Jerome Player, his handler, his full potential was unleashed.



NASA file/2009

Carlos, next to Kennedy Space Center security officer Jerome Player, took part in securing the center during President Barack Obama's visit on April 15, 2010.

Carlos and Player were featured on the cover of the May/June 2009 issue of Police K-9, a national magazine, for protecting Kennedy

Space Center.

Carlos, who died May 14, spent his final days at Player's home.

Vaughn added, "Carlos

gave his life to the people and missions of Kennedy Space Center and will not be forgotten by those who served with him."





From **ENERGY**, Page 1

"It's always an awesome pleasure to see how each team accomplishes the task with innovative designs and ideas. You should all be very proud of what you've accomplished over the last few days," Land said.

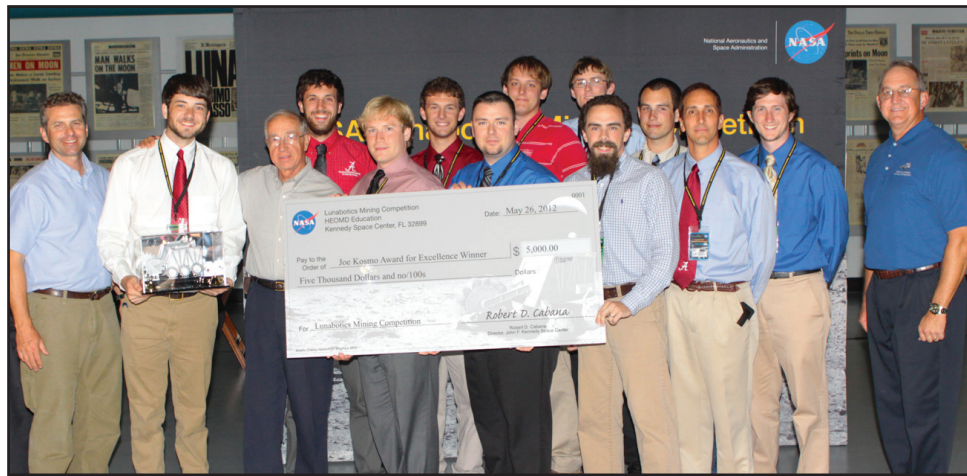
In all, 55 U.S. and international college and university teams spent months designing and building their versions of remote-controlled or autonomous excavators, called lunabots. Then they descended on Kennedy Space Center en masse to put their lunabots to the test in a large sandbox filled with lunar regolith simulant with a rocky terrain.

The 17 international teams came from Bangladesh, Canada, Colombia, India, Mexico, Romania and South Korea

"This competition gets bigger and better each year, with different ideas from people who don't do this every day," said Pat Simpkins, director of Kennedy's Engineering Directorate. "This is testing out concepts for what man is going to use to go beyond Earth orbit and explore."

At the opening ceremony, May 23, Kennedy Deputy Center Director Janet Petro welcomed the teams to the competition.

"This competition was designed to engage students in the study of science,



NASA/Jim Grossmann

The team from the University of Alabama took home the Joe Kosmo Award for Excellence for designing and operating the winning robotic vehicle during NASA's Lunabotics Mining Competition on May 26. The competition challenged university students to build machines that could collect soil such as the material found on the moon. Working inside the Caterpillar LunArena, the robotic craft dug soil that simulated lunar material. The event was judged by a machine's abilities to collect the soil, its design and operation, size, dust tolerance and its level of autonomy. With the team at left is Rob Mueller, Kennedy's chief of the Surface Systems Office and at right, Pat Simpkins, Kennedy's engineering director.

technology, engineering and mathematics, or STEM, courses, but it's amazing to think that the innovative concepts from today, from this week, could actually result in ideas and solutions that could be applied to real lunar excavation in the not-too-distant future," Petro said.

Building on the previous two year's itinerary, this year's competition had a few twists and turns. According to lead technical expert and head judge Rob Mueller, each team had two, 10-minute rounds to operate their lunabot to collect and deposit a minimum of 10 kilograms of lunar simulant.

"Scoring for the mining category was not based solely on the amount of material excavated," Mueller said.

"We also required the teams to consider various design operation factors such as dust tolerance and projection, communications, vehicle mass, energy or power required and the level of autonomy."

The on-site mining was only a portion of the competition. Each team also competed in other categories to collect points toward the coveted top honors, including writing a systems engineering paper, performing education outreach, creating a slide presentation and demonstration, team spirit, innovation, efficient use of power and use of social media.

Mueller, who is a senior technologist in the Surface Systems Office in Kennedy's Engineering Directorate and

one of the originators of the competition, has watched the competition grow from its first year in 2010. He, along with Kennedy Education Specialist Gloria Murphy, created it to help fill a gap between high school and the job market.

Murphy is lead for two of NASA's Human Exploration and Operations Mission Directorate education projects at Kennedy.

"A competition of this caliber gives the students a taste for what it's like to be on a multi-disciplinary team that develops a product to solve a complex problem," Murphy said. "These lunabot entries are helping NASA develop ideas for prototypes for mining on the moon, something that has never been done before."

## Winning Teams

### Joe Kosmo Award for Excellence (Grand Prize)

The University of Alabama in collaboration with Shelton State Community College

### On-Site Mining Award

**First Place** - Iowa State University in collaboration with Wartburg College  
**Second Place** - The University of Alabama in collaboration with Shelton State Community College  
**Third Place** - Milwaukee School of Engineering

### Judges Innovation Award

Polytechnic Institute of NYU

### Efficient Use of Communications Power Award

Iowa State University in collaboration with Wartburg College

### Best Use of Social Media

Universidad de Los Andes of Colombia

### Slide Presentation and Demonstration Award

**First Place** - The University of Alabama in collaboration with Shelton State Community College  
**Second Place** - West Virginia University  
**Third Place** - Universidad de Los Andes of Colombia

### Outreach Project Report Award

**First Place** - Iowa State University in collaboration with Wartburg College  
**Second Place** - Montana State University - Bozeman  
**Third Place** - John Brown University

### Systems Engineering Paper Award

**First Place** - Montana State University - Bozeman  
**Second Place** - John Brown University  
**Third Place** - University of Illinois at Urbana-Champaign

### Team Spirit Award

**First Place** - The University of Alabama in collaboration with Shelton State Community College  
**Second Place** - Instituto de Astrobiología Colombia IAC  
**Third Place** - Polytechnic Institute of New York University



NASA/Jim Grossmann

Children work with family members to build and program robots at the Kennedy Space Center Visitor Complex on May 25.

## Kennedy families participate in free robotics workshops

College students were not the only ones building and programming robots during the 2012 Lunabotics competition.

NASA's Kennedy Space Center also invited K-12 grade students to build and program LEGO® Mindstorms® NXT robots May 25 at the Exploration Station in the Center for Space Education at the Kennedy

Space Center Visitor Complex during the competition. Students also were invited to interact with the Lunabotics teams as they participated in the mining competition.

"It was a pleasure teaching children of all ages how to program the NXT robots," NASA Education Specialist Linda Scauzillo said. "The parents were amazed at how easily the children learned

the programming procedures."

The students participated in an hour-long session, spending 30 minutes building the robots and the other half participating in the competition. There were 81 participants, making it a huge turnout for the workshops.

-- **Brittney Longley**  
*Spaceport News*





# Scenes Around Kennedy Space Center



[CLICK ON PHOTO](#)

NASA/Dimitri Gerondidakis

Visitors along the jetties at Port Canaveral witness an unusual sight on May 24 -- the high-fidelity space shuttle model passing through the port heading for the Atlantic Ocean. The model is en route by barge from NASA's Kennedy Space Center in Florida to Space Center Houston, NASA Johnson Space Center's official visitor center. The model is expected to arrive June 1 in Houston and to be transported June 3 to Space Center Houston, its final destination, where it will become part of a unique display telling the story of the space shuttle's achievements and the nationwide team that made them possible. For more information about Space Center Houston, click on the photo.



[CLICK ON PHOTO](#)

NASA/Jim Grossmann

A NASA Railroad train crosses the railroad's Jay Jay Railroad Bridge north of Launch Complex 39 at NASA's Kennedy Space Center in Florida on May 23. The train is on its way to the Florida East Coast Railway interchange in Titusville, Fla., where the train's helium tank cars, a liquid oxygen tank car, and a liquid hydrogen dewar or tank car will be transferred for delivery to the SpaceX engine test complex outside McGregor, Texas. The surplus railroad cars were used in support of the Space Shuttle Program but are no longer needed by NASA following the completion of the program in 2011. Eight cars previously were shipped to California to support the SpaceX Falcon 9 rocket launches from Space Launch Complex-4 on Vandenberg Air Force Base. SpaceX already is using three similar helium tank cars left over from the shuttle program at Space Launch Complex-40 on Cape Canaveral Air Force Station in Florida. For more information, click on the photo.



[CLICK ON PHOTO](#)

NASA

Nine Merlin engines ignite under the SpaceX Falcon 9 rocket May 22 at Space Launch Complex-40 on Cape Canaveral Air Force Station in Florida. The launch is the company's second demonstration test flight for NASA's Commercial Orbital Transportation Services, or COTS, Program. For more information, click on photo.

## Kennedy workers take part in the 61st annual National Day of Prayer



Hundreds of Kennedy Space Center workers took part in the 61st annual National Day of Prayer in the Training Auditorium on May 3.

This year's theme, "One Nation Under God," is based on the verse from Psalm 33:12 which states: "Blessed is the nation whose God is the Lord."

Photos by NASA/Gianni Woods





# Former Apollo engineer meets with Orion spacecraft

By Steven Siceloff  
Spaceport News

The last time James Murphy set foot inside the Operations and Checkout Building at NASA's Kennedy Space Center in Florida, the high bay gleamed from polished white floors and walls and teemed with spacecraft destined for the moon being processed for flight.

After 40 years, that description still fits as Murphy and his family were given a VIP tour through the facility that now serves as Lockheed Martin's factory floor for the Orion spacecraft being prepped for a new generation of deep space journeys.

"White is bright," Murphy said while looking over the fixture holding the ground test article of the Orion spacecraft. "It looks very familiar, but of course, there aren't any of the other spacecraft in here these days, which is what I remember. The command module looks very similar. We had the lunar module and Saturn lunar module adapter."

Between serving as an assembly area for capsules and service modules, the



NASA/Glenn Benson

From left, Mike Murphy and James Murphy listen to Lockheed Martin's Jules Schneider share details of the processing of the Orion spacecraft inside the Operations and Checkout Building at NASA's Kennedy Space Center in Florida on May 24. For more on the Orion spacecraft, click on the photo.

high bay was used as the preparation area for space shuttle modules, including the SpaceLabs that astronauts worked in while in orbit.

Lockheed Martin renovated the vast assembly hall in 2009 so it could be used to build the Orion spacecraft. Workers pulled out antiquated cables, electrical gear and pipes and recoated the walls and floor to make a suitable area to build a

spacecraft to take astronauts to deep-space locales.

Two altitude chambers still are in place, though only one is working. The massive cylindrical chambers were constructed large enough to hold Apollo spacecraft to test for leaks. They also were used for leak checks of International Space Station modules such as the Destiny laboratory.

"These guys laid all the groundwork for us," said

Jules Schneider, Lockheed Martin's senior manager for Orion Assembly, Integration and Production. "They didn't have a guidebook. They thought they were doing the right thing, but they had no way of knowing if they were doing the right thing."

The State of Florida previously funded \$35 million to refurbish the O&C's high bay for Orion assembly and checkout.

Murphy worked for AC Delco on the navigation systems used in the Apollo spacecraft. He worked on Apollos 8 through 14 in different capacities during his two years at Kennedy.

"It seems like a long time but some of these things are like they happened yesterday," Murphy said. "I felt very fortunate to be here to begin, not thinking I would ever get there, but hoping I would."

## FAMU gets 'Closest to Altitude' at Launch Projects Challenge

By Brittney Longley  
Spaceport News

There's an old saying that goes, "If at first you don't succeed, pick yourself up and try again." That is exactly what Florida Agricultural and Mechanical University (FAMU) did during the 2011-12 NASA Launch Initiative on Braggs Farm in Toney, Ala., on April 22.

FAMU received the "Closest to Altitude" award, reaching 5,270 feet in the air, a mere 10 feet from the specified mark. This also was a special victory for FAMU, which was unable to launch last year because

it did not have a proper landing system.

"Without doubt, the team's biggest triumph was winning the altitude award at the Student Launch Projects Challenge," said Associate Professor Clement Allen, who is the team's advisor.

While the team took home an unexpected award, it faced the dilemma of having to replace members in the midst of the semester change.

"There was near 100 percent turnover in the team from the fall semester to the spring semester," Allen said. "That led to us essentially reforming the team during the

spring semester, which was challenging. The challenge was overcome by the talent, enthusiasm and commitment of the new members."

FAMU also is a grantee of NASA's Minority University Research and Education Program (MUREP) Small Projects (MSP), which focuses on minority research and enhancing capabilities of minority schools. The school received the Minority Innovation Challenges Institute (MICI) grant.

Kennedy Space Center MSP Project Manager Theresa Martinez said, "FAMU has exceeded all my expectations. They have participated and excelled in NASA

challenges themselves, and through the MICI grant, also have generated the first-time participation of 13 other minority institutions in NASA challenges."

MICI mentors and trains minority undergrad students to compete in NASA technology challenges, allowing them to attend educational sessions with no cost or fee.

Allen added, "I hope the team's success this year will inspire future students to get involved and that next year and in future years more and more students will get involved, and the experiments performed for the project will be increasingly creative."





# Orion clean room uses filters, fans instead of ceiling

By Steven Siceloff  
*Spaceport News*

**T**urns out a clean room doesn't necessarily need a roof, NASA is learning as it tries out a design that could be assembled around the Orion spacecraft where it is prepared for launch in the Vehicle Assembly Building (VAB) at Kennedy Space Center in Florida.

The key to the concept, developed by Astrotech, is two 10-foot-high walls of filter-equipped fans positioned 30 feet apart to push and pull the air in one direction across the capsule, keeping particles from settling on the spacecraft's surface.

A set of clear walls completes the box, but there is no ceiling. That's important because engineers want to use the large cranes already in the VAB to lift the Orion spacecraft and its shell into place as it is assembled on top of the Space Launch System rocket. If they have to build a clean room with its own crane, the cost would be much higher.

"The guys over in the

Operations and Checkout Building are using this and that's what gave us the idea," said Doug Lenhardt, an engineer with NASA's Ground Systems Development and Operations Program. "It's pretty innovative, so we'll see if it works."

The test, which involves a room built around a full-scale Orion model, has been running for two weeks on the floor of High Bay 3 in the VAB and will continue another two to three weeks.

"The results have been encouraging," Lenhardt said. "We don't have the full story yet, but it's been encouraging."

The demands of a clean room in the VAB are not nearly as strict as those in the Operations and Checkout Building where the Orion capsule will be built. In fact, the technicians in the O&C already are working with a similar setup to build the capsule components into a working spacecraft. Because even a slight contaminant can create problems inside a capsule, the O&C's entire high bay is kept to high cleanli-

ness standards with the area around Orion given an extra layer of protection.

In the VAB, the requirement is to keep visible contaminants, such as specks of dirt and dust, off the outside of the capsule.

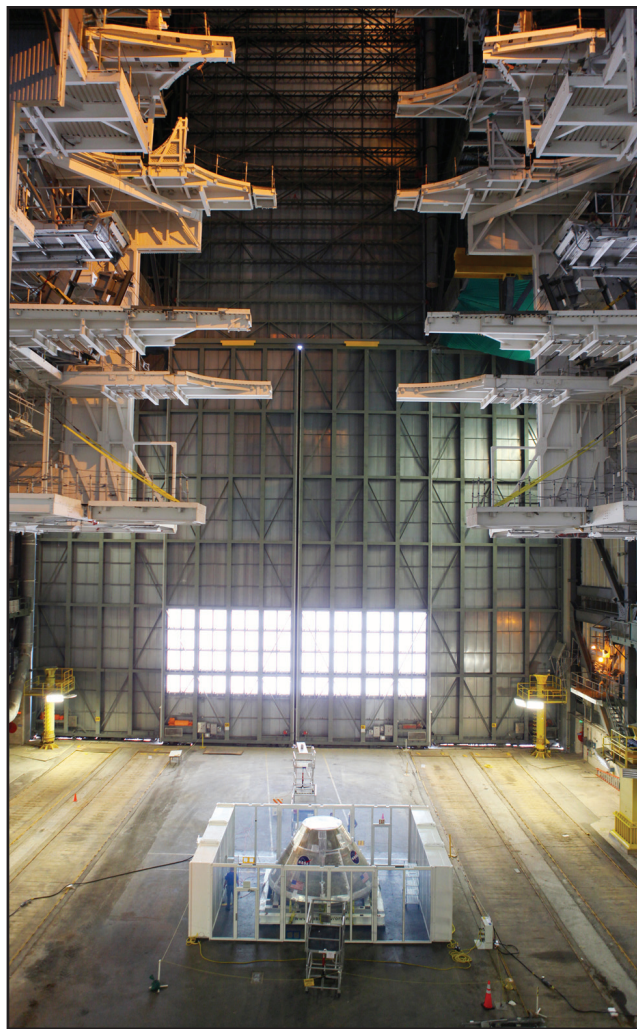
It may not sound like a big deal for something that will be exposed to space, but an earthly bit of pollen or sand or even a human hair can confuse a star tracker, lead to a build up around an exhaust port or block a thruster, for example.

And there are lots of particles looking for a place to settle in the VAB, especially when the doors are open and wind is swirling around.

"Conditions in the VAB are bad. It is much worse than being outside," said Walt Turner, senior integration engineer with Sierra Lobo. "It's like we have a dust creator."

The amount of particles in the VAB surprised John Weeks, an operations engineer overseeing the clean room evaluation.

"The particle environment we saw during the first week of this test, it was an



NASA/Dimitri Gerondidakis

The vast expanse of High Bay 3 in the Vehicle Assembly Building dwarfs the Orion test capsule and clean room on May 30. The clean room is designed to keep particles inside the VAB from collecting on the outside of the spacecraft during processing.

eye-opener for me," Weeks said, adding that opening the doors sees contaminants grow by five to 10 times. "They spike tremendously."

Engineers are not worried about the dirt getting inside Orion while it is in the VAB because the spacecraft always will have its hatch shut or be covered by the relatively sterile white room.

The clean room they want will protect Orion for a few hours or maybe a couple of days at most, when the shrink wrapping over the capsule has been removed but before the aerodynamic shell is connected around the conical spacecraft.

The work to prepare the capsule and mount it to the top of the massive Space Launch System rocket will

take place on platforms more than 300 feet above the VAB floor. It will be an arrangement similar to that used to assemble Apollo spacecraft atop Saturn V rockets for moon flights.

Orion and the Space Launch System are being designed with deep space destinations in mind, too. Coming on the heels of the space shuttle's 30-year career, this is the first time in a generation NASA engineers have developed a new spacecraft to send people into deep space.

"This is my first opportunity to work in the development phase of a spacecraft," Weeks said.

"It's a once-in-a-career opportunity, really."



NASA/Dimitri Gerondidakis

The vast expanse of High Bay 3 in the Vehicle Assembly Building dwarfs the Orion test capsule and clean room on May 30. The clean room is designed to keep particles inside the VAB from collecting on the outside of the spacecraft during processing.





# Students' microgravity experiments find way to station

By Kay Grinter  
Reference Librarian

NASA's commitment to fostering student retention and achievement in the science, technology, engineering and mathematics areas of study is long-standing.

Known as the STEM disciplines, NASA relies on breakthroughs in these fields to advance the technology needed for space exploration. Building a robust cadre of scientists and engineers for the future is a high priority for NASA.

Since its inception in June 2010, the Student Spaceflight Experiments Program has capitalized on NASA's science and exploration missions to encourage students to pursue a STEM-centric school curriculum.

SSEP gives 300 to 1,000 students across a community the opportunity to propose and design real microgravity experiments to fly in low Earth orbit.

The first two SSEP payloads flew in 2011 aboard space shuttles Endeavour and Atlantis on the STS-134 and STS-135 missions, respectively. A third round of experiments now has made its way to the International Space Station.

A suite of 15 SSEP experiments were aboard the SpaceX Dragon capsule when it docked with the station on May 25 and will be the first to be conducted in orbit by space station astronauts.

Known collectively as Aquarius, the experiments



CLICK ON PHOTO

NASA/Ryen Bean

Student participants in the Student Spaceflight Experiments Program receive a surprise visit from NASA administrator Charlie Bolden, right, and Kennedy Space Center Director Bob Cabana, third from left, as the students await the SpaceX Dragon launch May 19 in Kennedy's News Center. From left, are Cameron Zandstra, JP Peerbolte, Cabana, SSEP Director Dr. Jeff Goldstein, Jack Barth and Bolden. The budding scientists were excited to receive words of encouragement from two real-life astronauts. For more on the SSEP, click on the photo.

will assess the effects of microgravity on physical, chemical and biological systems. The students have been immersed in every facet of research, from definition of the investigation to experiment design, proposal writing and a formal NASA proposal review for selection of flight experiments.

As an added incentive to consider technical careers, the student investigators were treated like their adult counterparts and were invited to view the Dragon launch from the NASA's News Center at Kennedy Space Center, not far from where their experiments lifted off into space on neighboring Cape Canaveral Air Force Station.

Student investigators on three of the experiments made themselves available for interviews before the Dragon's first launch attempt on May 19.

Tenth-grader Ryan Puri from San Marino High School in San Marino, Calif., was enthusiastic about his participation developing the entry "Effect of Microgravity on the Antibacterial Resistance of *P. aeruginosa*."

"It was actually a really professional experience," Puri said. "I was really surprised to see that it was really much like an actual research program where you actually

feel like a real scientist."

For guidance on handling the bacteria and antibiotics involved in the experiment, he and his team members visited a laboratory in Pasadena, Calif., where they "got to put on lab coats, and our goggles and gloves and everything and really got to use all these machines." Puri assessed the experience: "It was really fun!"

Co-investigators Jack Barth, JP Peerbolte and Cameron Zandstra, all seventh- and eighth-graders from Highland Christian School in Lake County, Ind., were excited to be at Kennedy representing their entry, "The Effect of Microgravity on the Quality and Nutritional Value of the Seed Sprout of a Germinated 92M72 Genetically-Modified Soy Bean."

"This is like super great," Zandstra said. "It's like one of the best things to happen to me... so far."

"Just to see how doors have opened for us just by writing this paper," Barth added, "and especially in our first year of trying this program."

Peerbolte spoke for the team when he said, "It's amazing to see our soybeans on top of a rocket going to space to the International Space Station and microgravity."

Emily Soice, an eighth-

grader at Johnston Middle School in Houston, was principal investigator for her community's entry, "Hepatocyte Development in Bioscaffolds infused with TGFB3 in Microgravity."

Soice was aware of the historical significance of the Dragon flight and said she was feeling "very excited and honored that I get to be a part of the first commercial payload. It's a very cool experience."

Puri echoed her sentiment: "I think it's really an incredible experience, to be part of the next step in space exploration history."

The SSEP also takes the opportunity to inspire students' artistic side through a competition to design a mission patch to accompany their community's experiments into space.

The winning elementary patch for Charles County Public Schools in Maryland was designed by Lauren O'Neil, a fifth-grader at Walter J. Mitchell Elementary School in Charles County, Md.

O'Neil also agreed to be interviewed as any novice artist would.

"My science teacher, Mrs. Krebeck, told us about the competition and asked us if we wanted to participate," Lauren reported. "My brother Hayden has a lot

of books about space so I looked through them for inspiration."

Once she had completed her research, she chose her medium -- markers. Tucked in the lower left-hand corner is a slogan near and dear to the hearts of space enthusiasts everywhere: "The sky's not the limit."

The students especially were thrilled to receive a visit from a couple of real-life astronauts who stopped by the News Center to offer them some words of encouragement and a special thank-you for their hard work. Those astronauts sometimes are better known for the positions they now hold within NASA -- Kennedy Space Center Director Bob Cabana and NASA Administrator Charlie Bolden.



CLICK ON PHOTO

Student Spaceflight Experiments Program

This winning elementary patch was designed by Lauren O'Neil, a fifth-grader at Walter J. Mitchell Elementary School in Charles County, Maryland. For more on the mission patches, click on the photo.

## More information

To learn more about the Student Spaceflight Experiments Program, including future opportunities for student participation, visit <http://ssep.ncesse.org>





# Looking up and ahead . . .

\* All times are Eastern

2012

No earlier than June 13	Launch/Reagan Test Site Kwajalein Atoll: Pegasus XL, NuSTAR Launch window: 11:30 a.m.-3:30 p.m.
Targeted for June 18	Launch/CCAFS (SLC-41): Atlas V (AV-203), NROL-38 Launch window: 4:07 to 4:27 a.m.
June 28	Launch/CCAFS (SLC-37B): Delta IV-Heavy, NROL-15 Launch window: TBD
Aug. 2	Launch/VAFB (SLC-3E): Atlas V (AV-033), NROL-36 Launch window: TBD
3rd Quarter	Launch/Wallops Flight Facility (Launch Pad 0A): Orbital Sciences Antares test flight Launch time: TBD
Aug. 23	Launch/CCAFS (SLC-41): Atlas V-401, Radiation Belt Storm Probes (RBSP) Launch window: 4:07 to 4:27 a.m.

## In celebration of Kennedy Space Center's 50th anniversary, enjoy this vintage photo . . . FROM THE VAULT



NASA file/1965

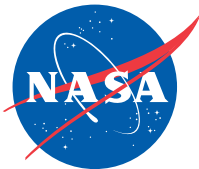
This aerial view of the Haulover Canal fish camp and the construction of the new Haulover Canal Bridge was taken on June 9, 1965. A motel, general store and a number of small homes are nestled on the west bank.



NASA photos

## Some like it hot, hot, hot

Kennedy Space Center Director Bob Cabana, center left, hands a \$1,134 donation check to "Aging Matters in Brevard" president/CEO Cindy Flachmeier on May 18 at Headquarters at Kennedy. The donation is from this year's KSC All-American Picnic Chili Cook-Off People's Choice Award winners, The Boeing Fire Breathers. "Aging Matters in Brevard" has 11 programs that help the elderly and disabled, including Meals on Wheels. Below is the team's storefront. In the photo above are, from left, Alyssa Garcia, co-chair for the Chili Cook-Off; Fire Breather team member Mike Dahm, Boeing; Fire Breather team member Diane Thomas, Boeing; Cabana; Flachmeier; Fire Breather team member Phil Lintereur, Boeing; Fire Breather team member Ken Koby, Boeing; and Jenna Valle, co-chair for the Chili Cook-Off.



John F. Kennedy Space Center

## Spaceport News

Spaceport News is an official publication of the Kennedy Space Center and is published online on alternate Fridays by Public Affairs in the interest of KSC civil service and contractor employees.

Contributions are welcome and should be submitted three weeks before publication to Public Affairs, IMCS-440. E-mail submissions can be sent to KSC-Spaceport-News@mail.nasa.gov

Managing editor . . . . . Candrea Thomas  
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Editorial support provided by Abacus Technology Corp. Writers Group.  
NASA at KSC is on the Internet at [www.nasa.gov/kennedy](http://www.nasa.gov/kennedy)  
SP-2012-05-103-KSC

